

CLAIMS:

1. A method for protecting a surface at one end of a reaction chamber having a longitudinal axis transverse to said surface and having a periphery radially remote from said axis, said surface having an inner area close to said axis and an outer periphery radially remote from said axis, the method comprising introducing a primary flow of reactants into the chamber in a manner whirling around said longitudinal axis, and withdrawing reaction products at an opposite end of the reaction chamber in a flow along the longitudinal axis, whereby said primary flow and said flow of reaction products approximate a free vortex flow which creates a pressure gradient, where the pressure is highest at the periphery of the chamber and lowest in the vicinity of the longitudinal axis, and introducing at said outer periphery of said surface a secondary protecting flow and directing it in said chamber towards said central area, whereby said pressure gradient of the vortex flow keeps said secondary flow adjacent said surface substantially over its entire area and, consequently, prevents said surface from contact with said primary flow and said flow of reaction products.
2. A method according to Claim 1, wherein said secondary flow is introduced in the chamber at a flow rate lower than that of the primary flow.
3. A method according to Claim 1 or 2, wherein said secondary flow may be free of any said reactants of the primary flow.
4. A method according to Claim 1, 2 or 3, wherein said primary flow comprises a working fluid and said secondary flow is free of said working fluid.
5. A method according to any one of Claims 1 to 4, whereby said secondary flow is used to cool said surface.
6. A method according to any one of Claims 1 to 5, whereby said primary flow is introduced into the chamber as a conical whirling jet flowing away from

said surface.

7. A method according to any one of Claims 1 to 6, whereby said primary flow is introduced into the chamber along an interior wall thereof.

8. A method according to any one of Claims 1 to 7, whereby radiation absorbing particles are introduced into the chamber in order to elevate said primary flow's temperature and thereby initiate the reaction.

9. A reaction chamber having a longitudinal axis and a periphery radially remote from said axis, a surface to be protected disposed at one end of the chamber and orientated substantially transversely to said longitudinal axis, said surface having an inner area close to said axis and an outer periphery radially remote from said axis, a primary ingress means adapted for introducing into the chamber a primary flow of reactants in a manner whirling around said longitudinal axis, an egress opening disposed at an opposite end of the chamber adapted for withdrawing reaction products from the chamber in a flow along said longitudinal axis, whereby said primary flow and said flow of reaction products approximate a free vortex flow which creates a pressure gradient, where the pressure is highest at the periphery of the chamber and lowest in the vicinity of the longitudinal axis, and a secondary ingress means adapted for introducing at said outer periphery of said surface a secondary protecting flow and directing it in said chamber towards said central area, whereby said pressure gradient of the vortex flow keeps said secondary flow adjacent said surface substantially over its entire area and, consequently, prevents said surface from contact with said primary flow and said flow of reaction products.

10. A reaction chamber according to Claim 9, wherein the longitudinal axis passes through said egress opening.

11. A reaction chamber according to Claim 9 or 10, wherein the reaction chamber is part of a volumetric solar receiver and the surface to be protected is a transparent window of said solar receiver adapted for admitting incident concentrated solar radiation.

12. A reaction chamber according to Claim 11, capable of being associated with a solar radiation concentrator via said transparent window.
13. A reaction chamber according to Claim 11, wherein said reaction chamber is shaped to approximate a black body radiation cavity.
- 5 14. A reaction chamber according to any one of Claims 9 to 13, wherein said chamber has walls that are capable of being heated up, and said primary ingress means are arranged so that said primary flow acts to extract heat from said walls prior to being introduced into said chamber.
- 10 15. A reaction chamber according to any one of Claims 9 to 14, further comprising means for introducing in the chamber refractory material disposed so as to heat said primary flow of reactants.
16. A reaction chamber according to any one of Claims 9 to 15, wherein said egress opening is axially extended towards said surface to be protected.
- 15 17. A reaction chamber according to any one of Claims 9 to 16, wherein said secondary ingress means are adapted for introducing in the chamber said secondary flow at a flow rate lower than that of the primary flow.

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